

## ERP SYSTEM FOR COLLEGE AUTOMATION USING RFID TAGS

Amritha Balachandran<sup>1</sup>, Bharti Chauhan<sup>2</sup>  
Umesh Chauhan<sup>3</sup>, Ashish Bokare<sup>4</sup>

Department of Computer Engineering, University  
of Pune Imperial College Of Engineering &  
Research, Pune, India

<sup>1</sup>amritha\_i@yahoo.com, <sup>2</sup>bhartiengr@gmail.com, <sup>3</sup>umesh.chauhan26@gmail.com,  
<sup>4</sup>ashishbokare@yahoo.co.in

**Abstract:** Design a College Enterprise Resource Planning System using RFID tags and to host the same on cloud. The main motive of the project is to provide full automation to the user. Enterprise resource planning (ERP) is a system that is commonly used in large industries to plan and utilize their resources properly, be it human resource or other inanimate resources. This ERP system can also be used in academic institutes. This will help the institution to utilize its resources in an efficient manner. This system is capable of greatly atomizing work. Since human memory cannot store too much data and is volatile there are chances for errors but with the help of a system that can store huge amount of data systematically the error quotient is greatly reduced. ERP system is capable of integrating different sections in an institution starting from admission section to student section. This kind of college ERP system can also be integrated with teaching tools like online assignments and teacher- student chat system. RFID (Radio Frequency Identification) can be thought of as a part of AIDC (Automatic Identification and Data Capture). AIDC is a technique to assign unique identifications to the products in an enterprise. This can be integrated with the ERP system for attendance purposes.

**Keywords:** RFID, cloud, Enterprise resource planning (ERP).

## 1. INTRODUCTION

Enterprise Resource Planning (ERP) is a planning philosophy enabled with software that attempts to integrate all the business processes of different departments and functions across an organization into a single system so that it can serve the particular needs of the different departments. Before ERP implementation, each department has its own computer system optimized for the requirement that a department needs. Each department use to maintain separate databases and design applications according to their functionalities. This lead to an overall poor results across all the departments. Many educational sectors in Asian countries in the past few decades have witnessed massive growth in a number of institutes and students. The associated policies and procedures related to various educational functions like admittance, pedagogy, interaction and examination have grown manifold and been streamlined. Also, it is seen that the information technology tools have offered pretty promising solutions to enable effective management of these functions. Enterprise Resource Planning combines all the important requirements of the organization together into a single, integrated software program that runs off a single database so various departments can share and communicate information more easily with each other.

## 2. LITERATURE SURVEY

Stone age	Middle age	Modern age
<b>Teachers</b>		
Teachers of this age write the attendance manually on papers, Count them and make a final entry. All this was time consuming and tedious. Adding complexity and thereby increasing the number of errors while performing the task.	These were a little better than the first. They used excel sheets for maintaining the records. This improved the functionalities like counting and adding, also reducing the time consumed. It had better chances of data recovery	In this age, the entire attendance system can be automised by using RFID tags. Thereby making the entire task easy and with minimum number of errors introduced.
<b>Students</b>		
Imagine students who has to go the concerned staff members for getting notifications for new activities, assignments, etc. and teacher entertaining each and every student. Students not getting the information due to lack of communication	The savior was a notice board hanging on a wall and thereby letting every student know what all assignments, activities students are supposed to do. Somewhat better way of mass communication with reduced work for teachers	However, the best way can be thought of as an online notice board to which, each and every student can have access through a student log in account provided to him. Getting all the information in one go
<b>Admission</b>		
This was an age where in students were supposed to stand in queue for hours, fill	Here, the process was computerized to some extent. The data about the	This project of our will automise the admission system completely. Students

the form manually on a piece of paper, submit the form and wait for the confirmation. Everything involved only paper with no security	students was filled and stored in computer. This increased the level of security and enhanced the backup capability. However, this still include some issues regarding the manual task	will be able to fill the form online which will give them a token number. This token number will help them to get the admission confirmation from the office, thereby avoiding the unnecessary paper work and manual task
<b>Report generation</b>		
This age yet again saw the involvement of papers and tedious tasks. The benchmarks for generating a progress report were on papers, generating report involved manual assessment and writing the report and submitting them with hands.	In this age, the report is typed manually but submission of report of was automised. Instead of submitting the report with hands, mailing feature of computer with internet was used. This ensured faster communication and saving time	Here, the report is generated automatically against the benchmarks using the application and then sending them to the respective person. The benchmarks are to be filled only once and are considered everytime.
<b>Campus placement</b>		
Campus placement process was completely a different process. The TPO was supposed to check the criteria for each student, notify them by a paper notice, and asking students to register on a piece of paper. Then sending these registrations to the company and completing the following process	This phase however, had an add on and the process was simplified using computers. But, just like before, the TPO was supposed to notify students, and giving them the info about the company and asking them to register.	This ERP system have a completely dedicated module for campus placement handled by TPO. Notifications, registration links, references, and all the relevant information about the placement will be provided in this module.
<b>College store</b>		
Store management in this phase involved lots of tedious task and record management was completely manual.	Maintaining the store was improvised in this phase. Record management was still the same leading to loopholes	This project however will have a module which automatically updates the repository. The status of the store will be reflected in this system.
<b>Online attendance</b>		
Here, teacher used to notify students about their attendance in class. Telling each and every student, his status of attendance individually	In this phase, a cumulative sheet of attendance was prepared and was put on to the notice board thereby using mass communication to interact	This project will have an online attendance system in which the student's attendance status will be available online in their personal acc.
<b>Online notice board</b>		
The tedious task of notifying students for various works was seen in this age. This was time consuming	Here, a wooden notice board was hanged in the dept. students, still were supposed to go to the dept and see the notice board	The solution for this is the online notice board which will provide you with the information when and where needed thereby reducing the students task
<b>Online assignments</b>		

This task is similar to the attendance system, Giving assignments to students in classroom. Assignments submission and checking being done manually. Maintaining the piles of notebooks	This phase made this task quite easy by using mass communication using notice board. However, maintaining notebooks was still hard. Loosing books was a major loophole	Getting assignments online and submitting those in the form of soft copies will be helpful in this case. Chances of data loss is reduced in this system
<b>Course management</b>		
Imagine a teacher sitting in staffroom and checking out the subjects she have taught and the topics she have to teach. Preparing notes of them, updating the information for higher authorities	This problem remained the same in this phase. However, notes were prepared in the form of soft copy. This did not had big effect on the system	This system will be of great use in this case. The course can be managed on computer and automatically updated on a daily basis. The report for the same can be generated automatically
<b>Report card generation</b>		
This was the phase when the result was displayed in bulk to the students with little information about the marks. The students were unaware of the marks and distribution details	Individual report cards were generated for each student. It had the complete detail of the marks given. Though it was not a good option as the report cards are to be handled and kept safe to protect it	The problems from previous phase will be solved in this phase. The reports cards will be available online and the print of the same can be taken as when It is needed. This safeguards the problems involved with hard copies
<b>Student-teacher chat systems</b>		
Stone age was an age where teachers used to behave like a broadcast machine even when they were supposed to tell thing personally to a particular students. This was an attack on their integrity	This was a little better, where private counseling was done by teachers for a particular student. His problems and solutions to them were discussed privately, thereby safeguarding his integrity. However, this is time consuming	Solution to this problem is available in this system, where online counseling is available through chat system. students can now clear their doubts online with the help of messages.

### 3. DESCRIPTION OF TECHNOLOGIES USED

#### 3.1 RFID (Radio Frequency Identification)

RFID (Radio Frequency Identification), these identifications can be thought of as the tags which can then be used to track the product as it traces its journey in an enterprise. AIDC previously used barcode technique for identifying certain products, their information and other particular details [1]. However, this system had certain drawbacks like only one barcode could be read at once. This issue was overcome by the introduction of RFID on AIDC which enables reading of 100s of identities at a time and analyzing the same simultaneously.

RFID in ERP system can highly atomize the attendance system and can reduce the tedious task done by the staff members [2]. Students in a college can be provided with a tag, which can be an identity card which has the necessary information of the student. The reader used in this case automatically emits the electromagnetic waves, which when interrupted by the tags, interrogate it. An Active Reader Passive Tag (ARPT) system comes with an active reader which interrogates the tag, within its reading zone. Though the tag is passive, it replies with the information it has. The information can include name, roll no, class (div) of the student. Or it can be said that the reader reads the information contained in the tag. This is required for the authentication of the student. Once the student is authenticated, his attendance record is updated in the database. This system is less error prone and also reduces the hectic task of staff. The whole records can then be retrieved from the memory which is attached to the reader [3].

The whole process is automatic and requires no human intervention as the reader continuously emits the encoded signals. It is a combination of both hardware and software, so it can be thought of as the embedded system, which includes readers and tags.

Certain schools in Japan have started tagging uniforms of students and faculty and other employees of schools so as to keep the track of people moving in and out of the college gate. The same can be used for the attendance updation of students. This can highly prevent the entry of unauthorized people in the premises.

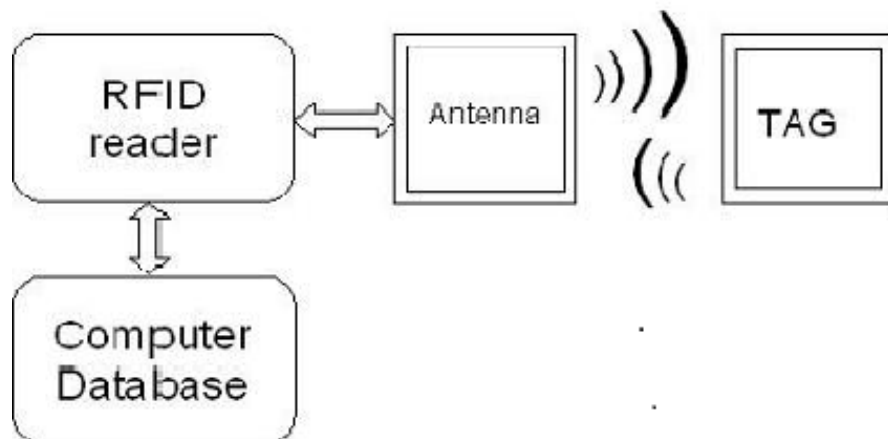


Fig 1.1 Working of RFID

Here, the RFID is connected to the computer database, which has the antenna generating electromagnetic waves continuously [3]. Whenever, a tag having the information comes within the reading zone of the reader, it detects it and asks for the information. The tag

responds with the information and the reader process the information. This is how the processing of attendance system using RFID is done.

### **3.2 CLOUD**

We are hosting our project on cloud. Cloud computing is internet-based computing in which large groups of remote servers are networked to allow the centralized data storage, and online access to computer services or resources. Cloud computing is the result of evolution and adoption of existing technologies and paradigms. The goal of cloud computing is to allow users to take benefit from all of these technologies, without the need for deep knowledge about or expertise with each one of them. The cloud aims to cut costs, and help the users focus on their core business instead of being impeded by IT obstacles [4]. Cloud computing is a kind of grid computing it has evolved by addressing the QoS (quality of service) and reliability problems. Cloud computing provides the tools and technologies to build data/compute intensive parallel applications with much more affordable prices compared to traditional parallel computing techniques [4].

## **4. PROPOSED ARCHITECTURE**

### **1. Admission Module**

- Students fill in the admission form online
- Token generated (3 days token die).
- Reach office carrying all necessary hard copies of official documents along with assigned fees to the college administrator.
- Upon verification of the same, the administrator accepts the fees and admission gets confirmed.
- A receipt of the same is immediately emailed to the student seeking admission and the same gets added to the college database of students.

### **2. Students login(DONE AFTER ADMISSION)**

- Generation of password and login id.
- Which would be sent via email.

### **3. Student information**

- Provides online access to student's
  - Personal and general information,
  - Contact information,
  - Parent's/guardian's information,
  - Educational information,
  - Classroom allocation,
  - Admission record,
  - Fees and dues record, student
- Students have access to this information along with Admin and Teachers depending on access rights given by the Admin.

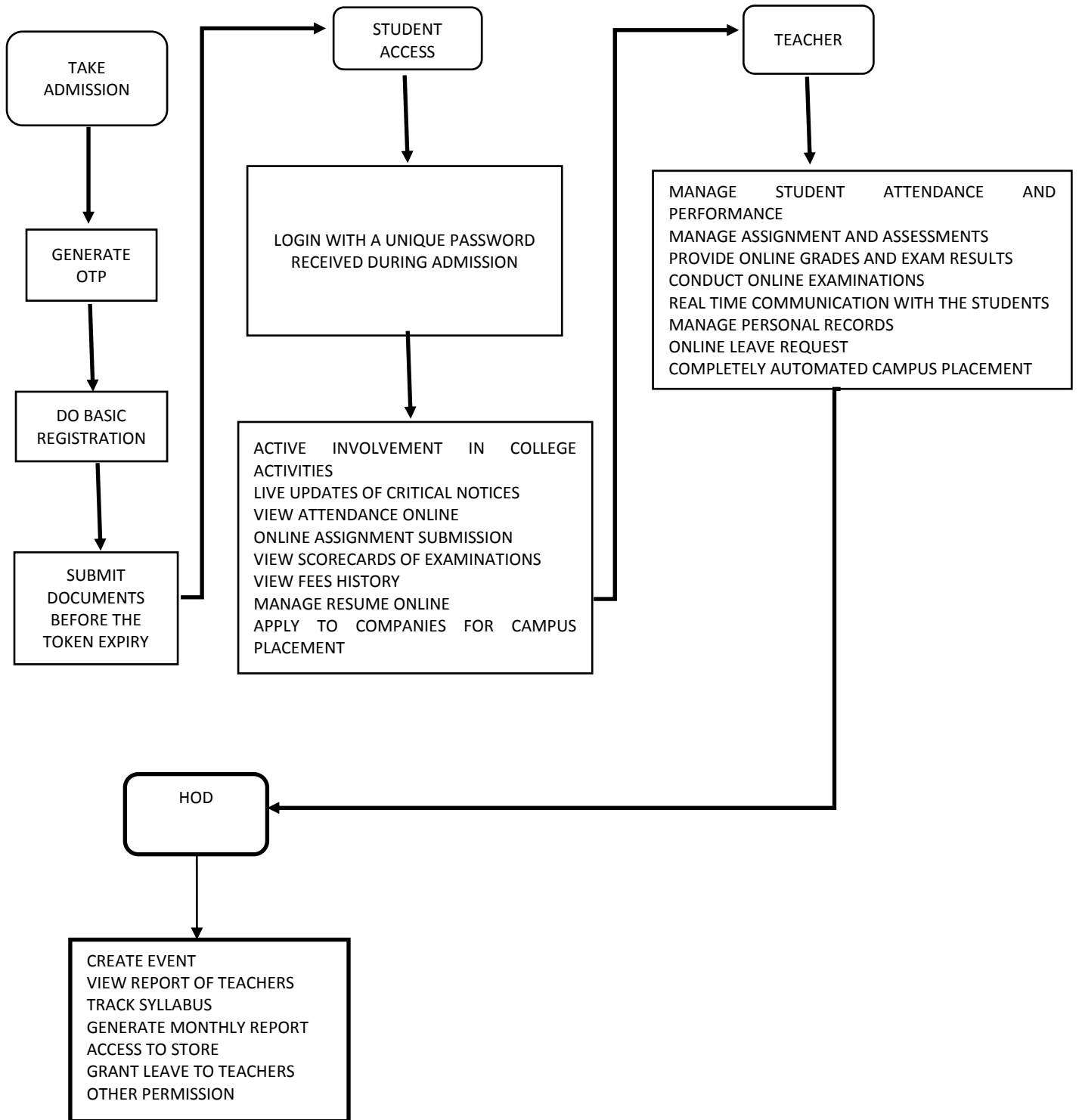


Fig 1.2 ERP System architecture

**4. Teachers login(authenticated by principal)**

- Teachers make there profile by their own
- Later approved by the principal.
- Grant of access rights

#### **5. Teacher information**

- teacher personal information,
- official information ,
- Staff leave request records subject list,
- Class list, etc.

#### **6. Staff HR module**

- Get the college staff profiles, which includes personal and official information under the staff HR module. Manage their salaries and leave requests online.
- Evaluation of Reports generated by lower authorities

#### **7. Report generation**

- Attendance reports (individual student/class/subject view),
- Assessment reports,
- Scorecard reports,
- Feedback reports (submitted by students) etc.

#### **8. Campus placement**

- a new module which creates links of companies which are recruiting
- TNP officer will be giving details of it.

#### **9. College store**

- ERP and would provide a dedicated buying channel for all the products and services such as laptop computers, software, college stationary etc.
- Details of the retailer.
  - Contact
  - No of goods taken
  - Date of buying
  - Date of delivery
  - Price of goods
  - Mode of payment
  - Guarantee period
  - Warrantee period

#### **10. Online Attendance**

- Attendance with the help of RFID CARDS.
- Updated in data base
- Teachers report generated
- Email sent to the students who are absent the very day.
- Monthly attendance report generated.
- Defaulters are fined.

#### **11. Online notice board**

- A specific notice board made for upcoming events
- Can be updated by teachers, HODS, PRINCIPAL, STUDENT coordinators
- Will provide links to specific modules also  
e.g. if any TNP activity related notice it will provide link to that module and from ether the student can easily read the full details, fill the form and submit it.

#### **12. Online assignments**

- Create an assignment and make it live for the classroom with due date.
- This due date keeps on reminding the student with the pending assignment making it impossible to miss the deadline.
- Students have the facility to submit the assignment online.



### **13. Timetable**

- Teachers too can view their schedules on a daily/weekly/yearly pattern.
- Where students see the subjects and teachers for the day,
- Teachers see the subjects and classes they have to teach.

### **14. Course management**

- The completion of the course my teachers is weekly updated and evaluated by the head or higher authority so to check the progress of the syllabus.

### **15. Report card generation**

- On the basis of the exams which the students have given the report card is generated
- Can be viewed by all with specific user id and password.

### **16. Student teacher chat system**

- Chat module for students and teachers

### **17. Important links**

- The important links are to be displayed like the link to Pune University. The admin should be able to display more links like during results and other important activities.

### **18. Leave module**

- An online form made for an application which is to be filled and submitted to the GFMS.

### **19. Transport module**

- Details of students coming via bus
- Amount paid
- Id card issue (bus pass)
  - Bus no
  - Contact details
  - Class
  - Name
  - College Name
  - Signature of transport officer
  - Signature of principal

## **5. DISADVANTAGES OF PROPOSED SYSTEM**

It might be hard to do the data entry for the students who have already taken admission in the college

## **6. RESULT**

Thus we conclude that ERP system for college automation using RFID TAGS and hosting the same on the cloud makes a huge difference in terms of reduction in workload, increase

in efficiency, security and accuracy of data. This system proves to be extremely reliable since there is no problem of data redundancy as well as data integrity is maintained.

The use of RFID tags reduces the time consuming and tedious job of manual attendance.

The processing time of RFID Tags compared to other system is much less.

## ACKNOWLEDGMENT

We would like to sincerely thank our guide, Prof Vinod Wadne, and our HOD, Prof S.R. Todmal, for their support and encouragement.

## REFERENCES

- [1] *Identifying the Missing Tags in a Large RFID System* Tao Li Shigang Chen Computer & Information Science & Engineering University of Florida, Gainesville, FL, USA tali, sgchen}@cise.ufl.edu Yibei Ling Applied Research Laboratories Telcordia Technologies, NJ, USA [lingy@research.telcordia.com](mailto:lingy@research.telcordia.com)
- [2] *Design and Application of the RFID Technology in ERP* Juan Tian, Xiujuan Wang & Lanhua Zhang College of Information Engineering, Taishan Medical University, Tai'an 271016, China
- [3] *Research on RFID Integration Middleware for Enterprise Information System* Li Minbo Software school, Fudan University, Shanghai, 201203, China Email: [limb@fudan.edu.cn](mailto:limb@fudan.edu.cn) Li Hua Software school, Fudan University, Shanghai, 201203, China Email: [082053018@fudan.edu.cn](mailto:082053018@fudan.edu.cn)
- [4] *The Basics of Cloud Computing* by Alexa Huth and James Cebula